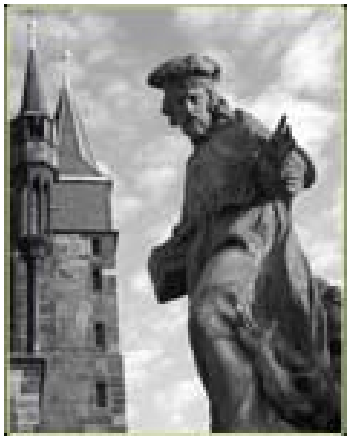
SEA and ecological compensation in land use plans



SEA Implementation and Practice: Making an Impact?
Prague, Czech Republic 21 - 23 September 2011

Special Conference on Strategic Environmental Assessment - IAIA SEA Prague II -2011

SEA and ecological compensation in land use plans

*Carlo Rega**

**Inter University Department for territorial studies and planning. Politecnico e Univesità di Torino (Itlay). Viale Mattioli, 39 - 10125 Torino (Italy).*

carlo.rega@polito.it

Abstract

Environmental compensation (or offset) is one of the distinctive feature of Environmental Assessment processes and its provided for by EU Directives on EIA, Habitat Regulation Assessment and SEA. The issue of ecological compensation has thus attracted interest within the EA domain in the last decade. However, attention has been paid so far more to the project level rather than to planning practices. On the other hand, there is a growing acknowledgement that a great amount of environmental depletion is being caused by the cumulative effects of small developments, which may pass through the net of environmental impact assessments. Urbanization is a paradigmatic example in this sense as it is acknowledged as one of the main drivers of the erosion of environmental capital. Spatial/land use plans, which set the frame for future urban development and consequent land take therefore represent a particularly relevant field of research for studying the actual implementation of ecological compensation measures. This paper aims at addressing some of the theoretic and methodological implication of ecological compensation in spatial/land use planning and to collect empirical evidence on its actual implementation by analyzing a relevant sample of recent spatial/land use plans elaborated in Italy in the last decade. The objectives is to explore to what extent ecological compensation is used in plan-making and how the theoretical, methodological and operational challenges it poses are addressed by current practice, in order to identify factors that can facilitate or hinder its actual implementation in plan-making. The role that SEA can play to this respect is also examined and critically discussed.

1. Introduction

Environmental compensation is, or should be, one of the distinctive feature of Environmental Assessment (EA) processes. Actually, any EA process should include, at a certain point, the identification of measures aimed at avoiding, mitigating or compensating the negative residual environmental effects of the action it applies to. Within the EU, this is clearly provided for by all the three Directive concerning EA procedures related to projects (EIA Directive), Natura 2000 sites (Habitat Directive 92/43/EC) and plans/programs (SEA Directive 2001/42EC, Annex I).

The issue of ecological compensation has thus attracted interest within the EA domain in the last decade. However, attention has been paid so far more to project-related compensation (especially highways and roads schemes) assessments practice than in plan-making and particularly in spatial planning and the associated environmental assessment processes, namely SEA. On the other hand, there is a growing acknowledgement that a great amount of environmental depletion is being caused by the cumulative effects of small developments, which may pass through the net of environmental impact assessments. Urbanization is a paradigmatic example in this sense. Except for large development processes, often entailing regeneration/development of ample areas, single development projects do not require an EIA; they produce small, localized effects; they are not perceived as environmental harmful and actually do not have apparent environmental impacts other that land take. Yet, cumulatively, urbanization is acknowledged as one of the main drivers of the erosion of environmental capital (EEA, 2006)

Actually, the need to consider the cumulative impacts of human actions at an adequate scale is one of the main reasons that lead to the institution of Strategic Environmental Assessment, and according to Annex I of the SEA Directive the cumulative nature of the envisaged effects should be assessed and furthermore it is one of the criteria to be used to decide whether plans and programs which determine the use of small areas at local level and minor modifications to plans and programs shall be subjected to the assessment.

Spatial/land use plans, which set the frame for future urban development and consequent land take and related effects (loss of environmental services, increased surface rainoff, habitat fragmentation, landscape degradation among others) therefore represent a particularly relevant field of application for ecological compensation measures.

This paper aims at addressing some of the theoretic and methodological implication of ecological compensation in spatial/land use planning and to collect empirical evidence on its actual implementation by analyzing a relevant sample of recent spatial/land use elaborated in Italy in the last decade. The objectives is to explore to what extent ecological compensation is used in plan-making and how the theoretical, methodological and operation challenges it poses are addressed by current practice, in order to identify factors that can facilitate or hinder its actual implementation in plan-making. The role that SEA can play to this respect is also examined and critically discussed.

2. Theoretic background

2.1 Methodological aspects

Several definition of environmental/ecological compensation can be found in literature. Kuiper (1997) defines it as “the creation of new values, which are equal to the lost values. If the lost values are irreplaceable, compensation concerns the creation which are as similar as possible”. According to Cowell (2000: 690) environmental compensation means “the provision of positive environmental measures to correct, balance or otherwise atone for the loss of environmental resources”. More

specifically, *ecological* compensation may be defined as "the substitution of ecological functions or values that are impaired by […] developments" (Cuperus et al., 2001).

Here, following Villarroya and Puig (2010) the term "ecological compensation" is preferred to "environmental compensation" in order to distinguish it from other forms of compensation -social and economic - which, within EA processes, are sometimes tagged as "environmental" since they are intended to compensate with socio-economic benefits environmental negative impacts.

The notion of ecological compensations is premised on the concept of natural (or environmental) capital defined as the stock of environmentally provided assets (such as soil, atmosphere, forests, water, wetlands), which provide a flow of useful goods or services. (Goodland, 1995). It is one of the four kinds of capital economists refer to, the other ones being human, human-made and social. Two different notions of sustainability may be defined in terms of capital maintenance: *weak sustainability* is defined as the maintenance of the 'total capital' (the sum of the four kind) and implies the substitutability of these forms, whilst *strong sustainability* is defined as the maintenance of the natural capital, regardless of its economic value. (ibid) In this conception, ecological compensation is the processes of creating new natural capital to offset the lost one.

The metaphor of natural capital has gained popularity over the last decades since it is easily understandable by policy makers and other relevant stakeholders (Cowell, 1997). However, the concept is not exempt from criticism; Cowell (1997) highlights the numerous problems arising from treating environments as a 'stock of natural capital': issues of value are inherent in definition of any form of capital (Spash and Clayton 1995), and environmental values/capital are no exceptions; the term 'capital' emphasize the material instrumental values of natural assets (the services they provide), but non instrumental values (such as cultural or spiritual) have also been considered essential components of Sustainable Development (Cowell, 1997: 294, Martinez Alier, 2002). Moreover, the concept of stock is quite static, while ecosystem services are the results of complex, dynamic interactions and flows of material and energy, and the whole ecosystem functionality is much more than the sum of its single components: what we call 'environment' is the result of long term interactions of human and non-human agents which often cannot simply be fully restored in a short period once deleted. This is particularly true for example, when the 'landscape' is at stake, conceived, as in the European Landscape Convention[1], as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (ELC, 2000, art. 1).

Technical difficulties arise in replicating the great biological and ecological complexity of ecosystem and turning ecological concepts into operational terms poses several uncertainties (Cowell, 1997, Wilding and Reameakers, 2000a; Pileri, 2007). In particular, the 'How much is enough?' question has no easy answer. How to measure the value of lost natural capital and hence the amount and kind of compensation needed is a major challenge for current research and practice, and proposed methodologies are far from being consolidated and widely accepted. A part representing a theoretic and – to some extent – ethic dilemma, this has also very practical consequences on the implementation of ecological compensation in spatial/land use planning. Wilding and Reameakers (2000a) for instance showed that the amount of land needed for compensation in the case of a relatively small housing development in Germany varies widely, even within a single assessment method, according to the value assigned to different aspects of the environment.

2.2 Procedural and process aspects

[1] Inserire riferimenti precisi

As Villarroya and Puig (2010) point out, some key steps and conceptualizations on how to understand and make good use of compensation are now established within the EA domain: first, compensation should concern only *residual* aspects, thus it should be the last phase of the mitigation sequence of avoiding, reducing, mitigating and then offsetting as a last resort (see also Pileri, 2007; Coperus et al., 2001).
Second, a hierarchy of compensation actions has been identified where the preferred order of methods would be restoration, creation, enhancement and preservation (Villarroya and Puig, 2010).
However, a part from the technical and methodological issues outlined in the previous sub-section, the implementation of ecological compensation measures in spatial/land use planning should also address process and procedural aspects related to the planning processes itself.
Generally speaking, the definition of compensation mechanisms implies that an *exchange* is *quantified* and *agreed* between two parties, typically the proponent of the action which causes loss of environmental capital and an public body (in land use planning these actors frequently being developers and municipalities). As Pileri (2007) highlights, exchange, quantification and agreements are typical features of a regulatory and evaluative framework, as the one provided by spatial planning laws and related SEA procedures. However, a number of critical aspects that should be taken into account. Ideally, compensations should be realized near to the affected site. In practice, this is not always possible. On the other hand, taking a landscape ecology approach, the most appropriate scale for a comprehensive assessment might be well a regional or sub-regional one, and suitable sites for compensation may be found away from the project site. Whilst they could be good sites from an ecological point of view, a social question arise, as the benefits of the compensation could be enjoyed by other human communities than the one that is primarily affected.

A further point related to the "where" question concerns the ownership of compensation areas. From a planning and regulatory perspective, this point is probably the most problematic one. In the Italian legal context for example, (but the same apply to many other national contexts), land use plans in fact determine property rights and establish rules on the possibilities and modalities of building, but only in exceptional cases they can expropriate land owned by private citizens or entities for public use. This poses a number of obstacles to the implementation of compensations measures.

In the simplest case, the municipality, which we can assume as representing the public interests of the community, is the direct owner of areas suitable for receiving compensation actions. In this scenario the municipality itself within the land use plans can identify the "receiving areas" among the land it owns, and establish specific rules relating the amount and kind of compensation actions requested for the realization of the developments (new houses, roads etc.) envisaged by the land use plan. In this case the implementation of compensation measure should be straightforward (at leat from a legal point of view) but, at least in the Italian context, the amount of land owned by municipalities is limited and, in most cases, is already used for other purpose (for example public service) and not often suitable for compensation.

Another case is that suitable areas for compensation, be they public or private ones, are part of the same areas on which the developments will be realized. In this case it can be assumed that, irrespective of the ex-ante situation concerning the ownership of the areas, the developer will acquire the land and then will have the legal right to act on them, both for the realization of the development and for implementing the compensation measures according to the rules established by the local plan.

In the third case, suitable areas for compensation are away from the localization of the development that causes the environmental depletion (for example soil consumption) *and* they are not owned by the developer (be it public or private). In this case, which is the most frequent one, there are only two possibilities: the first one is that the municipality expropriate the land, but this is most cases is not legally feasible nor convenient from a political and social point of view. The other possibility is that some forms of agreement are established between the three parties involved: the municipality,

the private developer and the private owner of the compensation areas. Whilst this implies a strong political commitment and would probably require a broader legal framework, it appears as the most promising way to render compensation measures part of "ordinary" planning practice. This aspect will be further discussed in the conclusion section.

In the following section the results of the empirical investigation on the state of application of compensation in Italian land use/spatial planning are presented and discussed.

3. Current compensation practice in spatial/land use plans: empirical evidence from Italy

3.1 Research questions and methods

In order to investigate if and how the above mentioned theoretical and practical aspects are dealt with in current planning practice, an empirical investigation was conducted on a number of spatial and land use plans approved in Italy from 2006 to 2011. In particular, the investigation was carried out on two types of plans, namely provincial spatial plans and municipal spatial (land-use) plans. The Italian planning system is articulated in three level, corresponding to the three administrative tier below the national level: Regions, Provinces and Municipalities. Each level elaborates its own planning instruments: regional plan sets out the main territorial development strategies and directives for the whole regional territories, which have to be further detailed by provincial plans, which also outline the specific objectives and rules for spatial development for the municipalities. In this hierarchy, municipal plans are the only one which establish specific land uses and affect property rights. Provincial and municipal plans are thus the most appropriate objects of investigation to study the application (or lack of) ecological compensation, as the former set out the rules and directives concerning the possibilities of developments (such as, for example, the maximum amount of land consumption allowed for each municipality) and the latter contain the specific provisions in relation to the quantity, localization and rules of intervention for the realization of the envisaged developments. However, since to have a statistically significant sample of municipal plans would require to examine hundreds of documents (Italy has more than 8.000 municipalities overall), attention was turned to the provincial level.

The sample examined comprised 25 Provincial spatial plans. The selection of these plans was made based on the availability of documents, the geographical coverage (in order to have samples from different Italian regions) and, in some cases, the direct involvement of the author in the planning process as a consultant for the elaboration of the Environmental Report. This sample accounts for 25% of all the Italian provinces, and 40% of the whole Italian population. Plans, including the attached Environmental Report, were scrutinized to extract information or evidence to answer the following three main research questions:

1. Are ecological compensation measures envisaged by the plan?
2. If ecological compensation are envisaged, are methods and procedures for implementation explained in detail?
3. If ecological compensation measures are provided for by the plan, are they monitored (is there a specific indicator in the monitoring program of the Environmental Report provided for by art. 10 of Directive 2001/42/EC?)

For each question, a simple three-cases grid was used, the three possibilities being:

- *No:* there was no reference at all in relation to the research question in the examined documents;
- *Partially:* there were some references but the related aspect was not addressed in detail;

- *Yes*: the issue was addressed in detail in plans' documents.

3.2 Results

The following table summarizes the results of the empirical investigation carried out on the 25 provincial plans, providing for each of the three research questions the number of plans and the percentage value.

Research Questions	Yes	Partially	No
1. Are ecological compensation measures envisaged by the plan?	6 (24%)	11 (44%)	8 (32%)
2. If ecological compensation is addressed, are methods and procedures for implementation explained in detail?	1 (4%)	6 (24%)	18 (72%)
3. If ecological compensation measures are provided for by the plan, are they monitored (is there a specific indicator in the monitoring program of the Environmental Report provided for by art. 10 of Directive 2001/42/EC?)	2 (8%)	0 (0%)	23 (92%)

Table 1: synthesis of the results of the empirical investigation on 25 Provincial Plans in Italy.

Results indicate that overall, in 66% of the cases ecological compensation measures were envisaged by plans, but only in 24% of the cases (6 out of 25) they were addressed by specific binding norms or rules of the plans. In the reminder 44% of the cases (11/25) only generic directives were found, stating that soil consumption or other environmental negative impacts caused by new developments shall be compensated, but without linking this to specific binding norms. In 8 cases (32% of the total) no reference at all was found.
As for implementation methods and procedures, the investigation was aimed to ascertain whether specific methods to determine the amount of area needed for compensation, or the specific types of compensation measures, or rules on the location of the areas for compensation were provided for. This was the case for just one examined plan; in 6 cases (24%), some methodological or normative rules were provided, but the implementation issue was not fully addressed and in the majority of the cases (18 out of 25, 72%) no information was provided at all. Finally, compensation measures were specifically comprised in the monitoring program only in two cases (8% of the total). Overall, only in one case compensation measures were introduced by the Plan with binding rules, methodologies to implement it were provided and they were part of the monitoring plan.

4. Discussion and conclusions

The results of the empirical investigation give rise to two interpretations. On the one hand, they indicate that ecological compensation is beginning to be considered as feasible and desirable by planners and decision-makers at the provincial level. Results indicate that there is a positive trend in the last years, that means that ecological compensation provisions were found in most recent plans. This was not to be taken for granted, since traditionally the Italian planning system has paid more attention to other form of compensation (social or economic) and no specific provisions for strictly ecological compensations are in place in the national planning law (dating back to 1942 and amended in 1967) nor in (more recent) regional planning laws. If, overall, this could be deemed as a positive element in the Italian context, it must be acknowledged that as regards implementation the

evidence collected are less promising. Compensation measures represents a cost for developers: if they are not linked to binding rules, it is unlike that they are realized by developers on a voluntary basis, or following generic orientations of local plans.
The following can be identified as the main element currently hindering the implementation of compensation measures:

1) **Lack of legal requirements:** as mentioned earlier, current national and regional laws on planning do not provide for binding rules linking the possibility of developments with the obligation to realize compensation measure. The establishment of a clear legal framework thus appears to be the most critical point in the Italian context. Developers are not used to consider compensations as an integral element in their projects and they will continue to do so unless legally obliged.

2) **Lack of established methodologies:** there is clearly an need for sound, but "ready-to-use" methods and tools to establish the amount and kind of compensation needed or required for different types of actions, based on the characteristics of the areas affected, their localization, their use for the local population and so on. The theoretical and methodological issues examined in the second section are not easy to tackle, so every established methodology could probably be criticised and could be improved with practice, but the lack of *any* established methods, which is the current situation, is the worst scenario.

3) **Municipal authorities are still more in pursue of social-economic compensations rather than ecological ones.** As stated before, traditionally the Italian planning system has worked with social and/pr economic compensation. Often, developers are required to pay a certain amount of money to the municipality as compensation, ever more in recent years given the financial crisis of local authorities in Italy and all over Europe. A change of attitude from policy-makers is needed (again, a clear and binding legal framework would be a good driver)

Finally, also in the case of established rules and political will, the problem of finding areas suitable for compensation remains. The way to make compensation feasible is that procedures are put in place that does not necessarily require land property to implement compensation measures (that means, that do not oblige developers or the municipality to acquire the areas on which to make compensations). Agricultural land are the main "pool" of areas usable for compensation. The idea that ensue form this investigations, and which is put forward also by other authors (Pileri, 2007) is that agreements should be reached between public authorities (Regions, provinces, municipalities), developers and farmers (the owners of the majority of potential compensation areas) so that the latter receive financial support (provided by developers) to implement compensation measure in their property, without selling them to third parties. A very similar mechanism is actually already in place in the European Union as regards Rural Development Programs financed by the European Agricultural Fund for Rural Development (EAFRD). Rural Development Programs finance farmers to provide ecological services by renouncing to part of their income derived from production. Similar mechanisms could be effectively put in place also within municipal or provincial plans, along with monitoring system to verify that compensation measure are not only realized but maintained in time.

The establishment of clear rules would allow plan-makers and developers to incorporate compensation costs directly in their plans and project budget and thus make ecological compensation an ordinary element of spatial planning.

References

Cowell R. (1997) Stretching the limits: environmental compensation, habitat creation and sustainable development. *Transactions of the Institute of British Geographers*, 22 (3): 292-306.

Cuperus R., Bakermans M., Udo De Haes H., Canters K.J. (2001) Ecological Compensation in Dutch Highway Planning. *Environmental Management*, 27 (1): 75-89.

European Environmental Agencies (EEA) 2006. Urban sprawl in Europe - The ignored challenge. *EEA Report No 10/2006*

Goodland, R. (1995). The Concept of Environmental Sustainability. *Annual Review of Ecology and Systematics* 26: 1-24.

Pileri P. (2007) *Compensazione ecologica preventiva. Metodi, strumenti e casi*. Roma: Carocci.

Spash C. L. and Clayton A. M. H. (1995) Strategies for the maintenance of natural capital. Discussion paper in ecological economics 95(5), Department of Economics, University of Stirling, Stirling.

Villaroya A. and Puig J. (2010) Ecological compensation and Environmental Impact Assessment in Spain. *Environmental Impact Assessment Review*, 30: 357–362.

Vitousek M, Ehrlich PR, Ehrlich AH, Matson P (1986) Human appropriation of the products of photosynthesis *Bio Science*, 34: 368-373

Wackernagel M , Kitzes J, Moran D, Goldfinger S, Thomas M (2006) The Ecological Footprint of cities and regions: comparing resource availability with resource demand. *Environment and Urbanization*, 18 (1): 103-112

Wilding, S. and Raemaekers, J. (2000a) Environmental compensation for greenfield development: is the devil in the detail? *Planning, Practice & Research*, 15 (3): 211-231

Wilding S. and Raemaekers J. (2000b) Can the British Planning Regime Learn from Germany? *Planning Theory & Practice*, 1 (2): 187-201